Scientific Note: The discovery of a second species of moth-butterfly (Lepidoptera: Hedylidae) in Jamaica, West Indies

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Abstract: The recent discovery of the moth-butterfly *Macrosoma cascaria* (Schaus, 1901), together with the already recognized *M. stabilinota* (Prout, 1932), results in a total of two species of *Macrosoma* (Hübner) known from Jamaica. Neither of these species are known to be present on either Cuba or Hispaniola, and there is no evidence so far of these being introduced accidentally to the island. Jamaica now lies far from any other landmasses, suggesting a possible Late Miocene origin, when the island was in closer proximity to Central America. The property on which *M. cascaria* was found is a protected wildlife haven, where the forested areas have been left virtually untouched for the last 150 years.

Key words: Blue Mountains, Jamaica, *Macrosoma,* Mandeville, mesic forest.

Species of *Macrosoma* (Hübner, 1818) (Hedylidae) are found from central Mexico south through Central America to northern South America, where they range from Colombia east to the Guianas, Surinam, and northern Brazil, south to Ecuador, Peru and central Bolivia and southeastern Brazil. Peru is the biological epicenter for *Macrosoma*, with some twenty-six species recorded. Although most Hedylidae are nocturnal, a few species are diurnal and are superficially similar in appearance to some butterflies, such as the Wood White (*Leptidea sinapis* (Linnaeus, 1758)), Pieridae, while also sharing some other structural and life history similarities with that butterfly family (Scoble, 1986; Scoble & Aiello, 1990).

Around the Caribbean, *Macrosoma rubedinaria* (Walker, 1862) (Fig. 1) is found in western and southern Mexico, through Central America to Colombia, east to northeastern Brazil, and south to Amazonian northern Peru and Bolivia, as well as Cuba, Trinidad, and Tobago. At one time this species was erroneously believed to occur in Jamaica (Barnes, 2001), and an unconfirmed report also suggested this insect was present on Hispaniola.

Trinidad has three additional species: *M. conifera* (Warren, 1897), *M. subordinata* (Warren, 1904), and *M. ustrinaria* (Herrich-Schäffer, 1854), (Cock, 2014; Cock & Alston-Smith, 2017b). Trinidad is faunistically aligned with South America, thus these records are not surprising, but they demonstrate the possible capability of some *Macrosoma* to disperse over water, reaching both Trinidad and Tobago from the mainland, a distance of not less than 11 km across the Gulf of Paria and an additional 30 km between Trinidad and the island of Tobago. However, these islands may have been connected during the late Pleistocene, permitting movement when sea levels would also have been lower during the height of the last glaciation from 11,000 to 13,000 years ago (Mychajliw *et al*., 2020). There has, however, been no direct connection between Cuba and the Yucatán, thus for *M. rubedinaria* to reach Cuba from the Yucatán would, at present, mean a flight of not less than 200 km. If this species has indeed reached Hispaniola, this would have required a second ocean crossing of 80 km across the Windward Passage; unlikely for this tiny moth, which has a wingspan of approximately 38 mm and a relatively weak flight.

As described in *Discovering Jamaican Butterflies and their Relationships around the Caribbean* (Turner & Turland, 2017), the first *Macrosoma* collected in Jamaica was a male *M. stabilinota* (Figs. 2-4) at Bath, St. Thomas Parish, by André Avinoff in 1937 (Fig. 5). The male of this species is superficially similar to the male and female of *M. rubedinaria*, with which it was first confused. However, *M. rubedinaria* displays a pair of small black discal spots on the dorsal forewing and a minute black discal spot on the dorsal hindwing. These markings are not present in *M. stabilinota*. Male and female *M. rubedinaria* are similar in appearance. The two species are further differentiated by the four small white subapical spots on the forewing, which are present only on the male of *M. stabilinota*. Also, the female of *M. stabilinota* displays a large forewing subapical arrowhead-shaped white spot, with two additional micro-spots above it, which are not present on the male of this species.

The first Jamaican female of *M. stabilinota* was collected at Jacks Hill, Kingston & St. Andrew Parish, by Ronald Bengry (from the Institute of Jamaica) in 1957. In 1963, Bernard Heineman, coauthor of *Jamaica and its Butterflies* (1972), collected a male and female in Port Antonio, Portland Parish. A fifth specimen, another male, was collected by Matthew Barnes, near Mavis Bank, St. Andrew Parish, in 1988 (Barnes, 2001). A further six specimens were observed and photographed near

Figure 1. *Macrosoma rubedinaria* at Matias Romero, Oaxaca, Mexico (photo courtesy of Juan Carlos García Morales).

Figure 2. ♂ *Macrosoma stabilinota* at Silver Hill Gap, St. Andrew Parish, 11 August 2018.

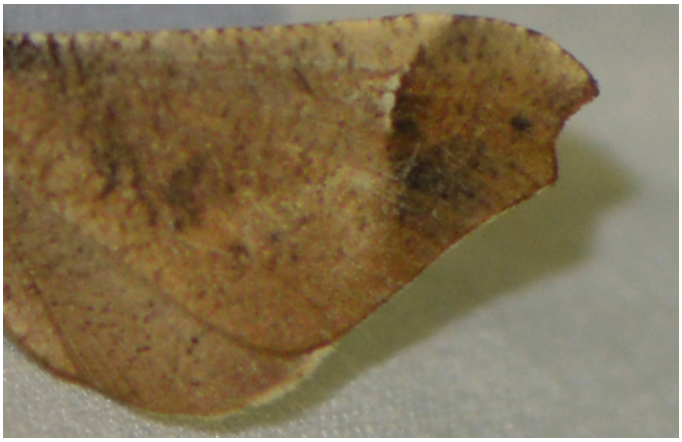

Figure 3. ♂ *Macrosoma stabilinota*, detail of right forewing of specimen at Figure 2.

Figure 4. ♀ *Macrosoma stabilinota* at Silver Hill Gap, St. Andrew Parish, 16 August 2014.

Silver Hill Gap, St Andrew Parish, between 2012 and 2014 (Turner & Turland, 2017). Finally, VT photographed a male *M. stabilinota* at 23:50 h on 3 December 2021, on an overcast night with a temperature of 19°C, in a forest clearing around 600 m from the site in Manchester Parish where *M. cascaria* was photographed. This represents the first specimen of *M. stabilinota* to be observed so far to the west in Jamaica.

A search for *Macrosoma* on the south side of the Cockpit Country north of Quickstep, Trelawny Parish, in west central Jamaica, was conducted in late July 2011. A further four nights were spent searching for this genus on the north side of the Cockpit Country near Windsor but without success. More extensive investigations are required.

There seems little reason why members of this genus should not be present in humid forested areas across the island, thus it was perhaps not surprising when VT and AH-S photographed a second species of *Macrosoma* at the site of Marshall's Pen, later identified as *M. cascaria* Schaus, 1901 (Figs. 6-7), representing the first record for this species in Jamaica. On 9 August 2021, heavy rain showers fell in the afternoon, but later cleared, leaving a partially overcast night sky with stars visible between clouds. The *Macrosoma* was observed at 19:59 h at a light source produced from a Honda Ex 350 generator with 110/350VA output, ballast and regulator, and 125W clear bulb placed in front of a large white collection sheet. The light was set up before sunset at 18:38 h and remained in place until 22:30 h. No further specimens were observed that evening. The insect was photographed using a Nikon D850 camera with a Micro Nikkor AF-S 105 mm lens and Nikon SB 800 Speedlight.

On the mainland, *M. cascaria* is found in Mexico from Mislanta, Veracruz and west central Tabasco, south through Central America to northern Venezuela, where species of *Croton* L. (Euphorbiaceae) and *Conostegia* D. Don (Melastomataceae) have been identified as larval food plants. Both of these genera are well represented in Jamaica (Adams, 1972). While possible accidental introductions of immature stages on plants from Central America to Jamaica cannot be discounted, the larval food plants and immature stages of these two species in Jamaica have not yet been discovered but are expected to be native plant species. It seems unlikely that there would be two separate introductions of this genus to the island, both of which would have had to survive on a relatively small number of imported plant seedlings or immediately adapt to using local larval food plants. Usually, the process of adapting to utilize unfamiliar native species of these plants would be expected to take place only over time. It is far more likely that both species of *Macrosoma* are native Jamaican species.

In summary, there are now two species of *Macrosoma* known from Jamaica; *M. stabilinota*, and the recently discovered *M. cascaria*. The nearest distance from Jamaica to the closest

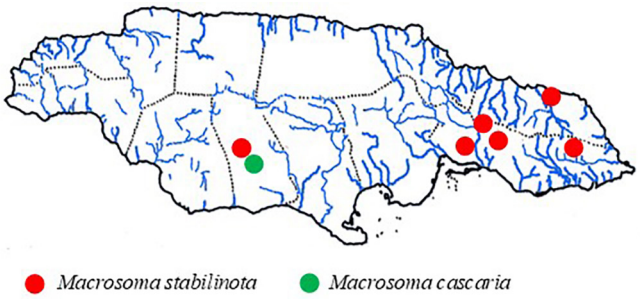

Figure 5. Distribution map of *Macrosoma* species in Jamaica.

Figure 6. *Macrosoma cascaria* at Marshall's Pen, Manchester Parish, 9 August 2021.

point of land in Honduras, where both these species occur, is approximately 1,027 km, a distance considered unlikely for such tiny moths to fly. Alternatively, these species may perhaps have reached the island when it was separated by as little as 200 km from the landmasses comprising the Nicaraguan Rise in the late Miocene, between about 23 and 5 million years ago (Iturralde-Vinent, 2006). For this reason, the DNA of both species of Jamaican *Macrosoma* should be investigated to determine if, over time, there has been enough divergence to support subspecific recognition.

The site where *M. cascaria* was recorded, Marshall's Pen (Fig. 8), is of significant ecological interest, being surrounded by habitations and lands degraded through quarrying for limestone and farming. Typical of a cattle property in Jamaica, Marshall's Pen property comprises a Great House, still used as a residence by the owner, Ann Haynes-Sutton, which is positioned among forested hills and a mostly linked network of pastures for grazing of beef cattle. More than 60 percent of the 125-hectare property is covered by mid-level mesic forest. The property is a declared Protected National Heritage Site, and it supports undisturbed forested areas and wildlife, including 330 plant species identified by the Institute of Jamaica's botanist George Proctor. These include rare species that may be indicators of old growth forests, such as *Pilostyles blanchetii* (Gardner) R. Br. (Apodanthaceae). Since 2018, more than 150 species of larger moths, some of these new Jamaican records, have been identified on this property. This total includes twenty-one species of Sphingidae, more than thirty species of Arctiinae, and seven species of Uraniidae (Epipleminae). Fifteen endemic species of butterflies are also known to be present. Among other fauna

Figure 7. *Macrosoma cascaria*, right dorsal forewing detail from specimen depicted in Fig. 6.

Figure 8. Mesic forest and cattle pasture habitat at the moth trapping site, Marshall's Pen, Manchester Parish.

at Marshall's Pen are endemic species of Hylidae, including the endangered Jamaican Green Tree Frog (*Osteopilus wilderi* Dunn), Jamaican Laughing Frog (*Osteopilus brunneus* Gosse), Jamaican Snoring Frog (*Calyptahyla crucialis* Harlan), the endemic crab *Metopaulias depressus* Rathbun (Sesarmidae), whose life cycle is confined to bromeliads, and five anoles (Dactyloidae): *Anolis garmani* Stejneger, *Anolis valencienni* Duméril & Bibron, *Anolis grahami* Gray, *Anolis lineatopus* Gray, and *Anolis opalinus* Gosse. The property is also one of the most important sites for birds in Jamaica, with more than one hundred species observed, including twenty-three of the thirty Jamaican endemics. Less common species, crested quail dove (*Geotrygon versicolor* Lafresnaye) (Colombidae), and greater Antillean elaenia (*Elaenia fallax* (Sclaterare) (Tyrannidae), are present. The property is an overwintering site for migratory and vagrant bird species (Haynes-Sutton *et al*., 2009).

This relative abundance of fauna and flora at Marshall's Pen property is a result of the fact that many of the forested hills have not been cleared in the last 150 years (although some have been subjected to selective harvesting of timber, sticks and posts) and some thickly forested often impenetrable rocky limestone outcrops, mostly at elevations between 650-690 m, have never been cleared, still largely retaining their original

vegetation. Canopy heights within the forested areas reach up to 15-20 m. Undulating pasture lands between the outcrops are mostly at an elevation of 650 m. Selective and ongoing rewilding of the estate, together with best farming practices, where herbicides and insecticides are minimally used for management of pasture lands, potentially contribute to the enduring presence of endemic species. In spite of serious degradation of Jamaica's forests during the last 350 years, there are still many areas of primary forest or forest that have been allowed to regenerate with very little disturbance for long periods. This reveals that important habitat niches still exist in Jamaica where unexpected new species can still be found.

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